

# CES-470

---

## COM Express Module

### User's Manual

Edition 1.1

2007/6/13



## **Copyright**

Copyright 2006, all rights reserved. This document is copyrighted and all rights are reserved. The information in this document is subject to change without prior notice to make improvements to the products.

This document contains proprietary information and protected by copyright. No part of this document may be reproduced, copied, or translated in any form or any means without prior written permission of the manufacturer.

All trademarks and/or registered trademarks contains in this document are property of their respective owners.

## **Disclaimer**

The company shall not be liable for any incidental or consequential damages resulting from the performance or use of this product.

The company does not issue a warranty of any kind, express or implied, including without limitation implied warranties of merchantability or fitness for a particular purpose. The company has the right to revise the manual or include changes in the specifications of the product described within it at any time without notice and without obligation to notify any person of such revision or changes.

## **Trademark**

All trademarks are the property of their respective holders.

---

Any questions please visit our website at <http://www.commell.com.tw>

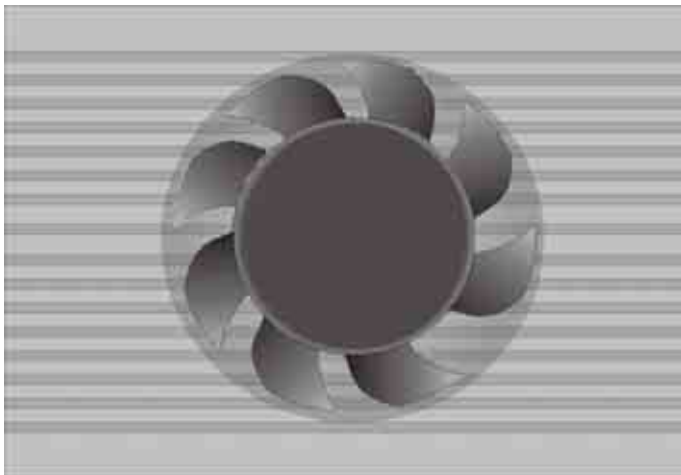
## Packing List:

Please check the package content before you starting using the board.

### Hardware:

CES-470 COM Express module x 1

### Cable Kit:



CES-470 heat sink x 1

Index

**Chapter 1 <Introduction>** .....6

    1.1 <Product Overview> ..... 6

    1.2 <Product Specification> ..... 7

    1.3 <Mechanical Drawing> ..... 9

    1.4 <Block Diagram> ..... 10

**Chapter 2 <Hardware Setup>** ..... 12

    2.1 <Connector Location> ..... 12

    2.2 <Connector Reference> ..... 13

        2.2.1 <Internal Connectors> ..... 13

    2.3 <CPU and Memory Setup> ..... 13

        2.3.1 <CPU Setup> ..... 13

        2.3.2 <Memory Setup> ..... 14

    2.4 <CMOS Setup> ..... 15

**Chapter 3 <System Setup>** ..... 16

    3.1 <Video Memory Setup> ..... 16

**Chapter 4 <BIOS Setup>** ..... 18

**Appendix A <Flash BIOS>** ..... 20

    A.1 <Flash Tool> ..... 20

    A.2 <Flash BIOS Procedure> ..... 20

**Appendix B <COM Express Pin assignment>** ..... 20

**Contact Information** ..... 25

**(This Page is Left for Blank)**

## **Chapter 1 <Introduction>**

### **1.1 <Product Overview>**

**CES-470** is the new generation of the COM express module, with supporting last Intel Pentium M processors for 533MHz front side bus, Intel 915GM(E) and ICH6-M chipset, integrated GMA900 graphics, DDR2 memory, support High Definition Audio, Serial ATA, PCI Express x16, x1 interface and one 10/100M base LAN.

#### **New Intel Pentium M Processor**

The module supports last Intel Pentium M processors with 400/533MHz front side bus, 2MB L2 cache, to provide more powerful performance than before.

#### **New features for Intel 915GM(E) chipset**

The module integrates Intel 915GM(E) and ICH6-M chipset, to provide new generation of the mobile solution, supports Intel GMA900 graphics, DDR2 400/533 memory, built-in high speed mass storage interface of serial ATA, High Definition Audio interface.

#### **All in One multimedia solution**

Based on Intel 915GM(E) and ICH6-M chipset, the module provides high performance onboard graphics, 18-bit dual channel LVDS interface, to meet the very requirement of the multimedia application.

#### **Flexible Extension Interface**

The module support one PCI-Express x16 slot, four PCI-Express x1, it also support four PCI slots.

## 1.2 <Product Specification>

### General Specification

Form Factor	COM Express module
CPU	Intel® <b>Pentium M</b> / <b>Celeron M</b> processors Package type: FC-PGA478 L2 Cache: 512KB/1MB/2MB Front side bus: 400/533MHz ( The Intel® Celeron® M Processor 4xx series have been designed to work with the Mobile Intel® 945 Express Chipset Family only .)
Memory	1 x 200-pin DDR2 SoDIMM 400/533MHz SDRAM up to 1GB Up to 4GB/s of bandwidth. Unbuffered, none-ECC memory supported only
Chipset	Intel® 915GM(E) (Northbridge) and ICH6-M (Southbridge)
BIOS	Phoenix-Award v6.00PG 4Mb PnP flash BIOS
Green Function	Power saving mode includes doze, standby and suspend modes. ACPI version 1.0 and APM version 1.2 compliant
Watchdog Timer	System reset programmable watchdog timer.
Real Time Clock	Intel® ICH6-M built-in RTC with lithium battery
Enhanced IDE	Support UltraDMA100 IDE interface supports up to 2 ATAPI devices
Serial ATA	Intel® ICH6-M integrates support 2 Serial ATA interfaces Up to 150MB/s of transfer rate

### VGA Display Interface

Chipset	Intel® 915GM(E) GMCH (Graphic Memory Controller Hub)
Frame Buffer	Up to 128MB shared with system memory
Display Type	Support CRT, LCD monitor with analog display Support 18-bit dual channel LVDS interface Support HDTV interface

### Ethernet Interface

Controller	Intel 82562ET PHY
Type	10/100Base-T auto-switching Fast Ethernet Full duplex, IEEE802.3U compliant

### Expansive Interface

PCI-Express	Support x16 PCI-Express slot ( <b>compatible with x1 slot</b> ) and four x1 slots PCI-Express x16 Up to 8GB/s of transfer bandwidth PCI-Express x1 up to 5Gb/s of transfer bandwidth Power supply: +3.3V, +12V
PCI	Support four PCI slots Power supply: +3.3V, +5V
LPC	Support LPC interface

---

Audio	Support HD audio or AC97 Codec
-------	--------------------------------

**Power and Environment**

Dimension	125(L) x 95 (H) mm
Temperature	Operating within 0 ~ 60 <sup>o</sup> C (32 ~ 140 <sup>o</sup> F) Storage within -20 ~ 85 <sup>o</sup> C (-4 ~ 185 <sup>o</sup> F)

**Ordering Code**

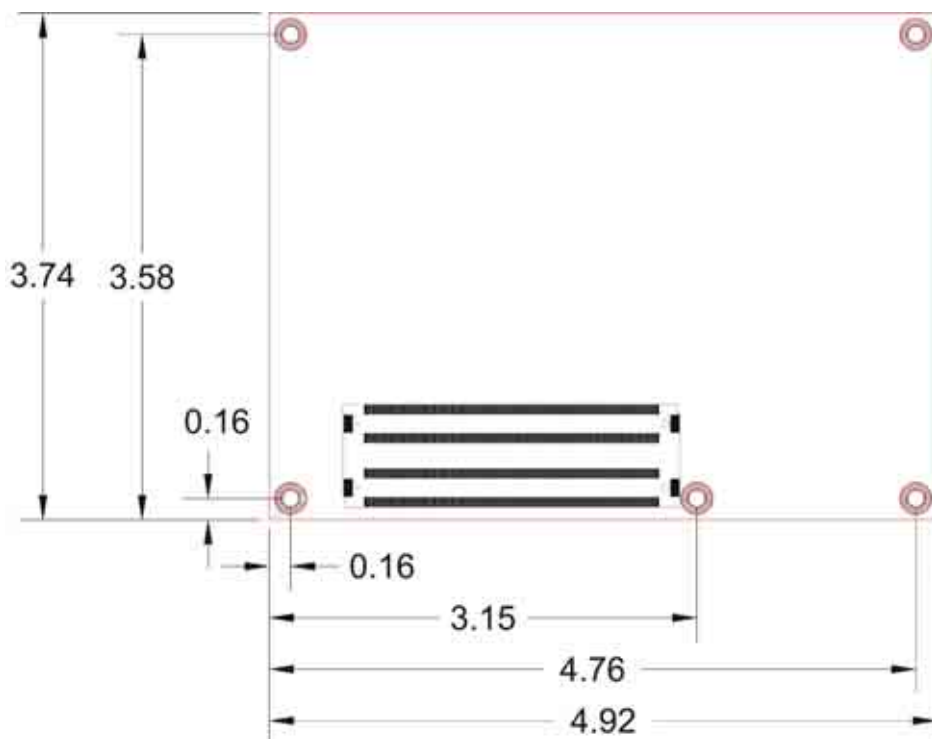
<b>CES-470</b>	COM Express module for Pentium M Processor
----------------	--

---

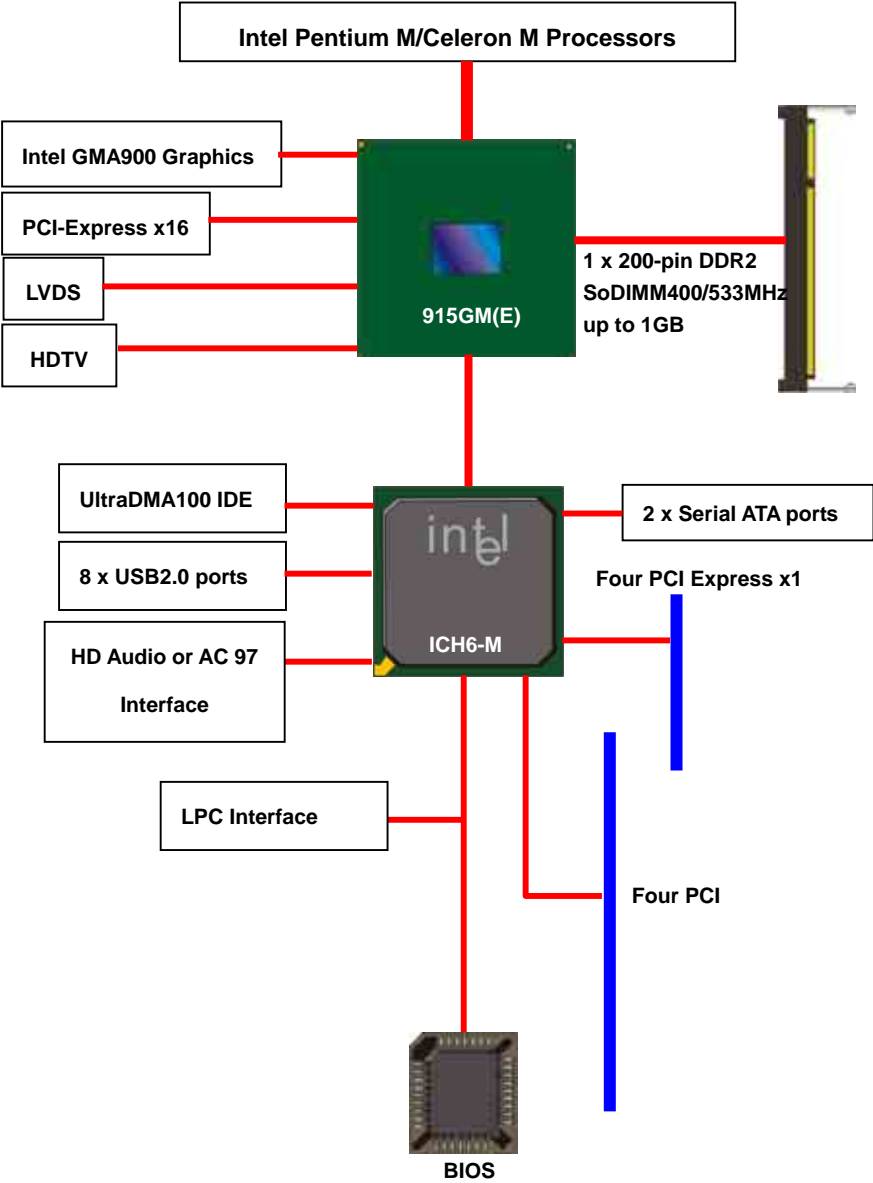
The specifications may be different as the actual production.  
For further product information please visit the website at <http://www.comnell.com.tw>



### 1.3 <Mechanical Drawing>



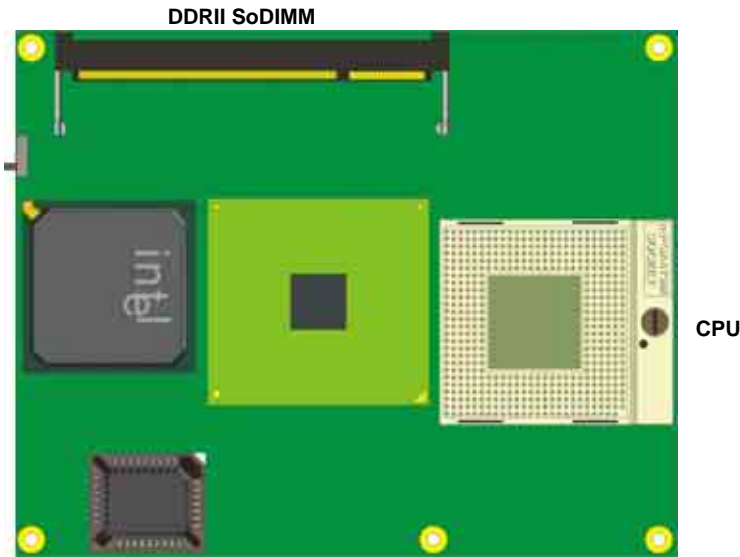
1.4 <Block Diagram>



**(This Page is Left for Blank)**

# Chapter 2 <Hardware Setup>

## 2.1 <Connector Location>



## 2.2 <Connector Reference>

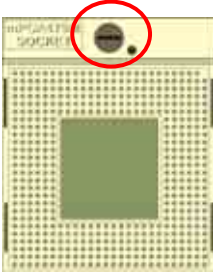
### 2.2.1 <Internal Connectors>

Connector	Function	Remark
CPU	Socket479 for CPU	Standard
DDRII	200 -pin DDR2 SoDIMM slot	Standard

## 2.3 <CPU and Memory Setup>

### 2.3.1 <CPU Setup>

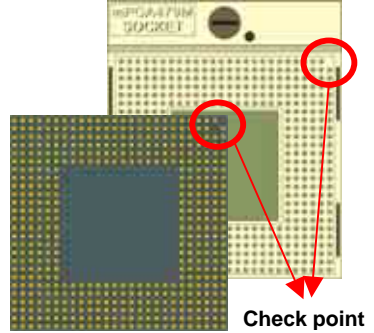
The module comes with the socket479 for Intel Pentium M/Celeron M processors, it supports new generation of Intel Pentium M processors with 533MHz of front side bus and 2MB L2 cache. Please follow the instruction to install the CPU properly.



1. Use the flat-type screw drive to unlock the CPU socket



Unlock way



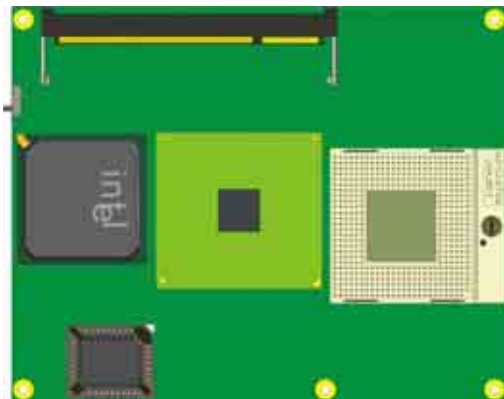
2. Follow the pin direction to install the processor on the socket



3. Lock the socket

### 2.3.2 <Memory Setup>

The module provides one 200-Pin DDRII SoDIMM slot 400/533 memory modules up to 1GB of capacity. Non-ECC, unbuffered memory is supported only.



(1. Insert the DDR So-DIMM module into the socket at 45 degree)



(2. Press down the module with a click sound)

## 2.4 <CMOS Setup>

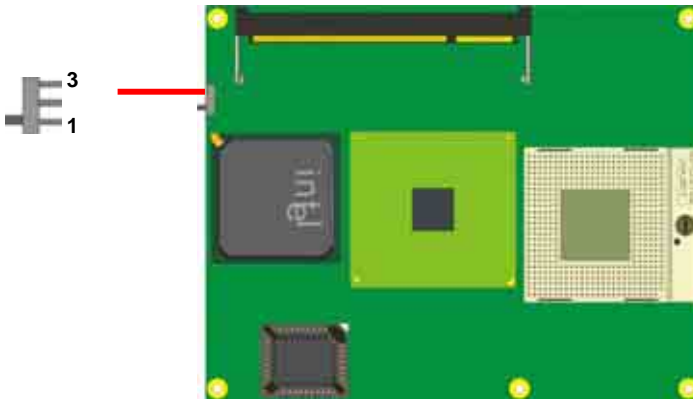
The board's data of CMOS can be setting in BIOS. If the board refuses to boot due to inappropriate CMOS settings, here is how to proceed to clear (reset) the CMOS to its default values.

**Jumper: JRTC**

**Type: Onboard 3-pin jumper**

JRTC	Mode
2-3	Clear CMOS
1-2	Normal Operation

Default setting



## 2.5 <Ethernet Interface>

The module integrates with one Intel 82562ET Ethernet PHY. The Intel 82562ET supports triple speed of 10/100base-T, with IEEE802.3 compliance and Wake-On-LAN supported.

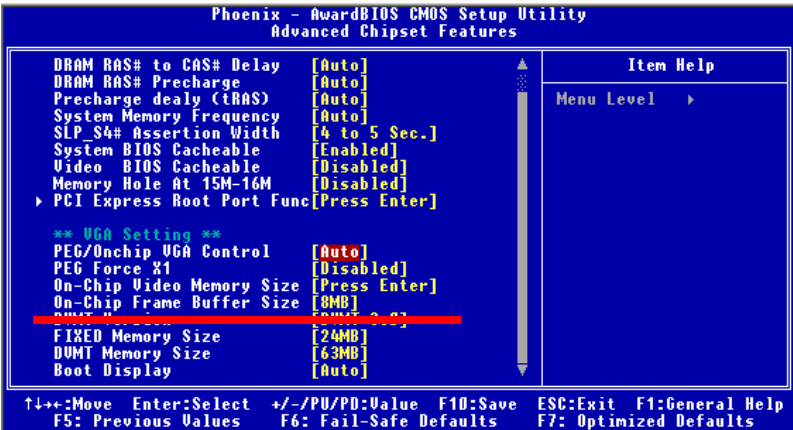
## Chapter 3 <System Setup>

### 3.1 <Video Memory Setup>

Based on Intel® 915GM(E) chipset with GMA (Graphic Media Accelerator) 900, the board supports Intel® DVMT (Dynamic Video Memory Technology) 3.0, which would allow the video memory to be allocated up to 128MB.

To support DVMT, you need to install the Intel GMA 900 Driver with supported OS.

#### BIOS Setup:



**On-Chip Video Memory Size:** This option combines three items below for setup.

#### On-Chip Frame Buffer Size:

This item can let you select video memory which been allocated for legacy VGA and SVGA graphics support and compatibility. The available option is **1MB** and **8MB**.

#### Fixed Memory Size:

This item can let you select a static amount of page-locked graphics memory which will be allocated during driver initialization. Once you select the memory amount, it will be no longer available for system memory.

#### DVMT Memory Size:

This item can let you select a maximum size of dynamic amount usage of video memory, the system would configure the video memory depends on your application, this item is strongly recommend to be selected as **MAX DVMT**.



**Fixed + DVMT Memory Size:**

You can select the fixed amount and the DVMT amount at the same time for a guaranteed video memory and additional dynamic video memory, please check the table below for available setting.

System Memory	On-Chip Frame Buffer Size	Fixed Memory Size	DVMT Memory Size	Total Graphic Memory
128MB~255MB	1MB	32MB	0MB	32MB
	1MB	0MB	32MB	32MB
	8MB	32MB	0MB	32MB
	8MB	0	32MB	32MB
256MB~511MB	1MB	64MB	0MB	64MB
	1MB	0	64MB	64MB
	1MB	128MB	0MB	128MB
	1MB	0	128MB	128MB
	1MB	64MB	64MB	128MB
	8MB	64MB	0MB	64MB
	8MB	0	64MB	64MB
	8MB	128MB	0MB	128MB
	8MB	0	128MB	128MB
	8MB	64MB	64MB	128MB
512MB upper	1MB	64MB	0	64MB
	1MB	0	64MB	64MB
	1MB	128MB	0	128MB
	1MB	0	128MB	128MB
	1MB	64MB	64MB	128MB
	8MB	64MB	0	64MB
	8MB	0	64MB	64MB
	8MB	128MB	0	128MB
	8MB	0	128MB	128MB
	8MB	64MB	64MB	128MB

Notice:

1. The On-Chip Frame Buffer Size would be included in the Fixed Memory.

Please select the memory size according to this table.

# Chapter 4 <BIOS Setup>

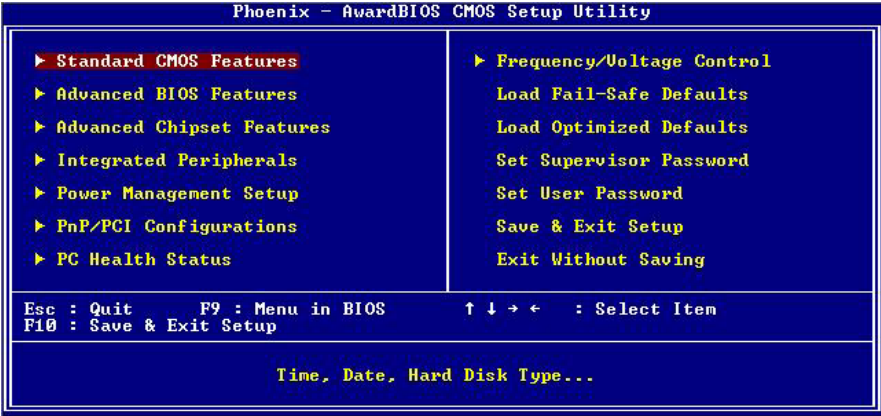
The motherboard uses the Award BIOS for the system configuration. The Award BIOS in the single board computer is a customized version of the industrial standard BIOS for IBM PC AT-compatible computers. It supports Intel x86 and compatible CPU architecture based processors and computers. The BIOS provides critical low-level support for the system central processing, memory and I/O sub-systems.

The BIOS setup program of the single board computer let the customers modify the basic configuration setting. The settings are stored in a dedicated battery-backed memory, NVRAM, retains the information when the power is turned off. If the battery runs out of the power, then the settings of BIOS will come back to the default setting.

The BIOS section of the manual is subject to change without notice and is provided here for reference purpose only. The settings and configurations of the BIOS are current at the time of print, and therefore they may not be exactly the same as that displayed on your screen.

To activate CMOS Setup program, press <DEL> key immediately after you turn on the system. The following message “Press DEL to enter SETUP” should appear in the lower left hand corner of your screen. When you enter the CMOS Setup Utility, the Main Menu will be displayed as **Figure 4-1**. You can use arrow keys to select your function, press <Enter> key to accept the selection and enter the sub-menu.

Figure 4-1 CMOS Setup Utility Main Screen



**(This Page is Left for Blank)**

## Appendix A <Flash BIOS>

### A.1 <Flash Tool>

The board is based on Award BIOS and can be updated easily by the BIOS auto flash tool. You can download the tool online at the address below:

<http://www.phoenix.com/en/home/>

[http://www.commell.com.tw/Support/Support\\_SBC.htm](http://www.commell.com.tw/Support/Support_SBC.htm)

File name of the tool is "awdflash.exe", it's the utility that can write the data into the BIOS flash ship and update the BIOS.

### A.2 <Flash BIOS Procedure>

1. Please make a bootable floppy disk.
2. Get the last .bin files you want to update and copy it into the disk.
3. Copy awardflash.exe to the disk.
4. Power on the system and flash the BIOS. (Example: C:/ awardflash XXX.bin)
5. Restart the system.

Any question about the BIOS re-flash please contact your distributors or visit the web-site at below:

<http://www.commell.com.tw/support/support.htm>

## Appendix B <COM Express Pin assignment>

A1	GND	A38	-USBOC6	A75	ATX2+
A2	N/C	A39	USBP4-	A76	ATX2-
A3	N/C	A40	USBP4+	A77	LVDD EN
A4	ETH_SPD-	A41	GND	A78	N/C
A5	3VSB	A42	USBP2-	A79	N/C
A6	N/C	A43	USBP2+	A80	GND
A7	N/C	A44	-USBOC2	A81	ACLK+
A8	ETH_LINK-	A45	USBP0-	A82	ACLK-
A9	ETH_RX0-	A46	USBP0+	A83	LVDDCLK
A10	ETH_RX0-	A47	RTCVCC	A84	LVDDDAT
A11	GND	A48	N/C	A85	N/C
A12	ETH_TX0-	A49	N/C	A86	-RCIN
A13	ETH_TX0-	A50	SERIRQ	A87	A20GATE
A14	ETH CTREF	A51	GND	A88	PCIECLK
A15	-SLPS3	A52	N/C	A89	-PCIECLK
A16	SATA0TXP	A53	N/C	A90	GND
A17	SATA0TXN	A54	N/C	A91	N/C
A18	-SLPS4	A55	N/C	A92	N/C
A19	SATA0RXP	A56	N/C	A93	N/C
A20	SATA0RXN	A57	GND	A94	N/C
A21	GND	A58	PCIE_TXP4	A95	N/C
A22	SATA2TXP	A59	PCIE_TXN4	A96	GND
A23	SATA2TXN	A60	GND	A97	+12V
A24	-SLPS5	A61	PCIE_TXP3	A98	+12V
A25	SATA2RXP	A62	PCIE_TXN3	A99	+12V
A26	SATA2RXN	A63	N/C	A100	GND
A27	-BATLOW	A64	PCIE_TXP2	A101	+12V
A28	-SATALED	A65	PCIE_TXN2	A102	+12V
A29	AC SYSNC	A66	GND	A103	+12V
A30	-AC RST	A67	N/C	A104	+12V
A31	GND	A68	PCIE_TXP1	A105	+12V
A32	AC BCLK	A69	PCIE_TXN1	A106	+12V
A33	AC SDOUT	A70	GND	A107	+12V
A34	N/C	A71	ATX0+	A108	+12V
A35	-THERMTRIP	A72	ATX0-	A109	+12V
A36	USBP6-	A73	ATX1+	A110	GND
A37	USBP+	A74	ATX1-		

B1	GND	B38	-USBOC4	B75	BTX2+
B2	ETH ACT-	B39	USBP5-	B76	BTX2-
B3	-LFRAME	B40	USBP5+	B77	N/C
B4	LAD0	B41	GND	B78	N/C
B5	LAD1	B42	USBP3-	B79	BKL EN
B6	LAD2	B43	USBP3+	B80	GND
B7	LAD3	B44	-USBOC0	B81	BCLK+
B8	-LDRQ0	B45	USBP1-	B82	BCLK-
B9	-LDRQ1	B46	USBP1+	B83	BKL CRTL
B10	LPC33CLK	B47	N/C	B84	5VDU
B11	GND	B48	N/C	B85	5VDU
B12	-ICHBTN	B49	-SYSRST	B86	5VDU
B13	SMBCLK	B50	-CBRST	B87	5VDU
B14	SMBDATA	B51	GND	B88	N/C
B15	GPI11	B52	N/C	B89	CRT R
B16	SATA1TXP	B53	N/C	B90	GND
B17	SATA1TXN	B54	N/C	B91	CRT G
B18	-SUSTAT	B55	N/C	B92	CRT B
B19	SATA1RXP	B56	N/C	B93	CRT HS
B20	SATA1RXN	B57	N/C	B94	CRT VS
B21	GND	B58	PCIE_RXP4	B95	CRTDCLK
B22	SATA3TXP	B59	PCIE_RXN4	B96	CRTDDAT
B23	SATA3TXN	B60	GND	B97	TVA PB
B24	PWR_GD	B61	PCIE_RXP3	B98	TVB Y
B25	SATA3RXP	B62	PCIE_RXN3	B99	TVC PR
B26	SATA3RXN	B63	N/C	B100	GND
B27	WDT	B64	PCIE_RXP2	B101	+12V
B28	AC SDIN2	B65	PCIE_RXN2	B102	+12V
B29	AC SDIN1	B66	-PCIEWK	B103	+12V
B30	AC SDIN0	B67	-LPCME	B104	+12V
B31	GND	B68	PCIE RXP1	B105	+12V
B32	ICHSPKR	B69	PCIE RXN1	B106	+12V
B33	SMLINK0	B70	GND	B107	+12V
B34	SMLINK1	B71	BTX0+	B108	+12V
B35	-THERM	B72	BTX0-	B109	+12V
B36	USBP7-	B73	BTX1+	B110	GND
B37	USBP7+	B74	BTX1-		

C1	GND	C38	-CBE2	C75	PEG RXN7
C2	PDD7	C39	AD17	C76	GND
C3	PDD6	C40	AD19	C77	N/C
C4	PDD3	C41	GND	C78	PEG RXP8
C5	PDD15	C42	AD21	C79	PEG RXN8
C6	PDD8	C43	AD23	C80	GND
C7	PDD9	C44	-CBE3	C81	PEG RXP9
C8	PDD2	C45	AD25	C82	PEG RXN9
C9	PDD13	C46	AD27	C83	N/C
C10	PDD1	C47	AD29	C84	GND
C11	GND	C48	AD31	C85	PEG RXP10
C12	PDD14	C49	-PIRQA	C86	PEG RXN10
C13	PIORDY	C50	-PIRQB	C87	GND
C14	-PDIOR	C51	GND	C88	PEG RXP11
C15	-PME	C52	PEG RXP0	C89	PEG RXN11
C16	-GNT2	C53	PEG RXN0	C90	GND
C17	-REQ2	C54	N/C	C91	PEG RXP12
C18	-GNT1	C55	PEG RXP1	C92	PEG RXN12
C19	-REQ1	C56	PEG RXN2	C93	GND
C20	-GNT0	C57	N/C	C94	PEG RXP13
C21	GND	C58	PEG RXP2	C95	PEG RXN13
C22	-REQ0	C59	PEG RXN2	C96	GND
C23	-PCIRST	C60	GND	C97	N/C
C24	AD0	C61	PEG RXP3	C98	PEG RXP14
C25	AD2	C62	PEG RXN3	C99	PEG RXN14
C26	AD4	C63	N/C	C100	GND
C27	AD6	C64	N/C	C101	PEG RXP15
C28	AD8	C65	PEG RXP4	C102	PEG RXN16
C29	AD10	C66	PEG RXN4	C103	GND
C30	AD12	C67	N/C	C104	+12V
C31	GND	C68	PEG RXP5	C105	+12V
C32	AD14	C69	PEG RXN5	C106	+12V
C33	-CBE1	C70	GND	C107	+12V
C34	-PERR	C71	PEG RXP6	C108	+12V
C35	-PLOCK	C72	PEG RXN6	C109	+12V
C36	-DEVSEL	C73	SDVODAT	C110	GND
C37	-IRDY	C74	PEG RXP7		

D1	GND	D38	AD18	D75	PEG TXN7
D2	PDD5	D39	AD20	D76	GND
D3	PDD10	D40	AD22	D77	P66DET
D4	PDD11	D41	GND	D78	PEG TXP8
D5	PDD12	D42	AD24	D79	PEG TXN8
D6	PDD4	D43	AD26	D80	GND
D7	PDD0	D44	AD28	D81	PEG TXP9
D8	PDDREQ	D45	AD30	D82	PEG TXN9
D9	-PDIOW	D46	-PIRQC	D83	N/C
D10	-PDDACK	D47	-PIRQD	D84	GND
D11	GND	D48	N/C	D85	PEG TXP10
D12	IDEIRQ	D49	N/C	D86	PEG TXN10
D13	PAD0	D50	PCISCLK	D87	GND
D14	PAD1	D51	GND	D88	PEG TXP11
D15	PAD2	D52	PEG TXP0	D89	PEG TXN11
D16	-PCS1	D53	PEG TXN0	D90	GND
D17	-PCS3	D54	CFG9	D91	PEG TXP12
D18	IDESET	D55	PEG TXP1	D92	PEG TXN12
D19	-GNT3	D56	PEG TXN1	D93	GND
D20	-REQ3	D57	N/C	D94	PEG TXP13
D21	GND	D58	PEG TXP2	D95	PEG TXN13
D22	AD1	D59	PEG TXN2	D96	GND
D23	AD3	D60	GND	D97	N/C
D24	AD5	D61	PEG TXP3	D98	PEG TXP14
D25	AD7	D62	PEG TXN3	D99	PEG TXN14
D26	-CBE0	D63	N/C	D100	GND
D27	AD9	D64	N/C	D101	PEG TXP15
D28	AD11	D65	PEG TXP4	D102	PEG TXN15
D29	AD13	D66	PEG TXN4	D103	GND
D30	AD15	D67	GND	D104	+12V
D31	GND	D68	PEG TXP5	D105	+12V
D32	PAR	D69	PEG TXN5	D106	+12V
D33	-SERR	D70	GND	D107	+12V
D34	-STOP	D71	PEG TXP6	D108	+12V
D35	-TRDY	D72	PEG TXN6	D109	+12V
D36	-FRAME	D73	SDVOCLK	D110	GND
D37	AD16	D74	PEG TXP7		



## Contact Information

Any advice or comment about our products and service, or anything we can help you please don't hesitate to contact with us. We will do our best to support you for your products, projects a business.

### Taiwan Commate Computer Inc.

---

Address	8F, No. 94, Sec. 1, Shin Tai Wu Rd., Shi Chih Taipei Hsien, Taiwan
TEL	+886-2-26963909
FAX	+886-2-26963911
Website	<a href="http://www.commell.com.tw">http://www.commell.com.tw</a>
E-Mail	<a href="mailto:info@commell.com.tw">info@commell.com.tw</a> (General Information) <a href="mailto:tech@commell.com.tw">tech@commell.com.tw</a> (Technical Support)

---

**Commell is our trademark of industrial PC division**